PIPE SYSTEMS

Installation

Equipment & instructions

ductile iron solutions
www.trm.at

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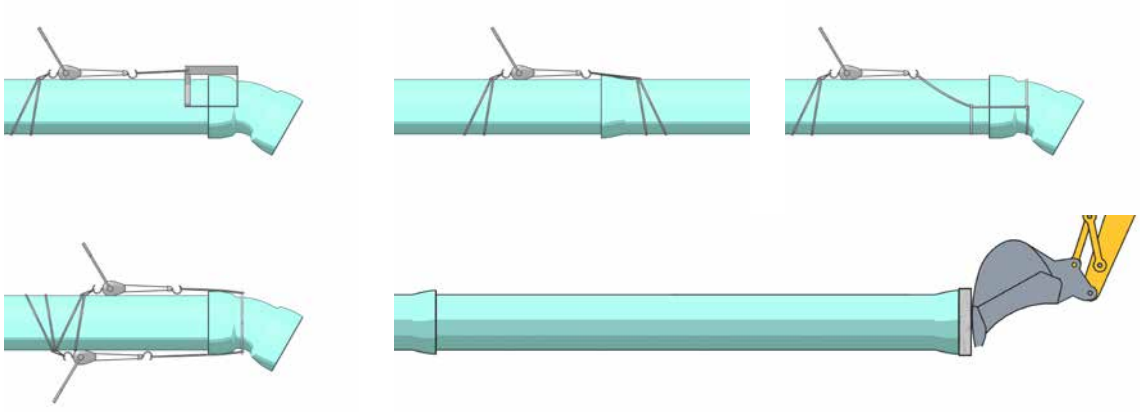


General information about assembly equipment

Installing pipes DN 80 - DN 1000

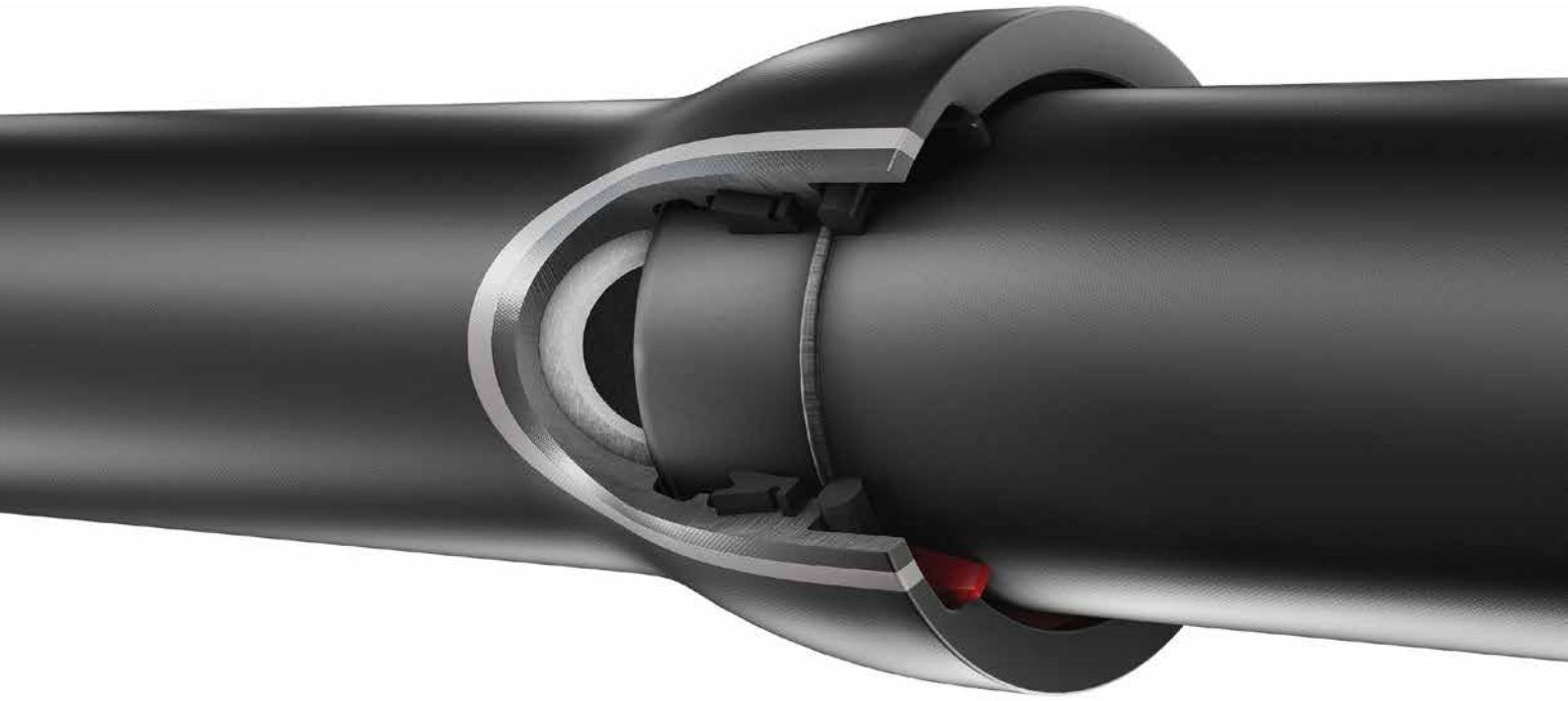
There are several ways to assemble pipes.
Installation with:

+ TRM assembly equipment DN 80 to DN 400,
  type 1 for PUR coating,
  type 2 for ZMU coating and
  type 3 for WKG pipe systems
+ Chain hoist and round slings
  (DN 80 - 200/2m | DN 250 - 400/3m |
  DN 500/4m | DN 600/6m)
+ Square timber up to DN 125
+ Mounting clip and chain hoist

If excavators are used to install pipes, the spigot must be inserted slowly and evenly into the socket so that the gasket ring has time to deform.

⚠ A sufficiently strong square timber must be placed between the excavator bucket and the pipe socket (see diagram).

⚠ For installing pipes and fittings with VRS®-T joints, see diagram.



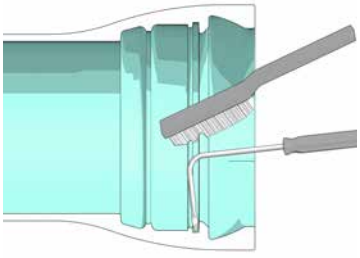
Installation instructions for VRS®-T joints

DN 80 to DN 500

These installation instructions apply to ductile iron pipes and fittings according to EN 545 and ÖNORM B 2597 with VRS®-T restrained locking systems DN 80 to DN 500.

Cleaning the joint parts

The gasket seat, retaining groove, retaining chamber, lock and shank must be kept clean. A special scraper or a bent screwdriver is recommended for cleaning the retaining groove.



Position of the socket openings in pipe trenches DN 80 to DN 250

To insert the locks, we recommend that the socket openings be positioned as shown. Where the fittings should be positioned is determined by the circumstances of each installation.

Position of the socket openings in pipe trenches DN 300 to DN 500

Cleaning the gasket

Clean the gasket, check for damage and press it together to form a heart shape.

Inserting the gasket

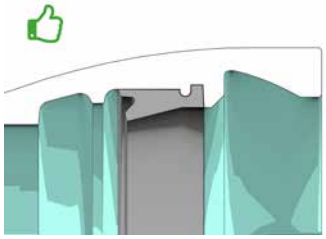
Insert the gasket into the socket so that the outer hard rubber claw engages in the retaining groove of the socket. Then smooth out the loop.

Smoothing out the gasket

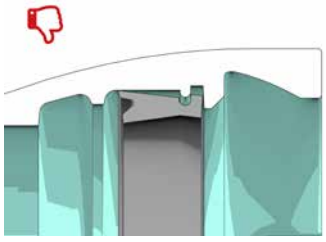
If smoothing the loop causes problems, pull out a second loop on the opposite side. These two small loops can then be smoothed easily.

Gasket seat

The inner hard rubber edge of the seal should not project over the centering collar.



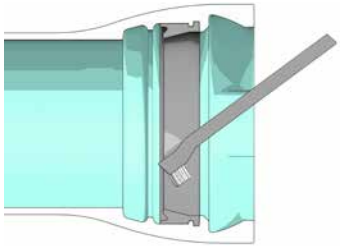
Gasket in wrong position



Lubricants

Apply a thin coat of lubricant to the tight-fitting gasket and the cleaned shank, especially at the bevel.

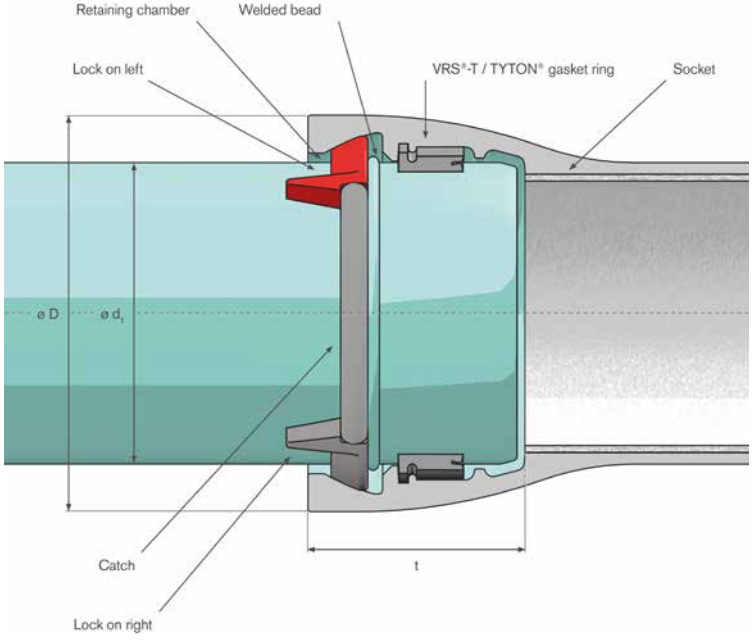
⚠ In case of frost or high heat, the lubricant and the gaskets must be stored together in one room.



Securing the joint

Pull or push the shank in until it stops.

⚠ Insert or push in the straight (axial) shank.
⚠ Bending must be avoided during assembly.



VRS®-T joint DN 80 to DN 250

+ VRS®-T EPDM gasket ring according to EN 681-1
+ 1 lock, right (black)
+ 1 lock, left (red)
+ 1 catch

Insert the lock on the right (black) into the large socket opening and push it to the right until it stops. Then insert the lock on the left (red) and push it to the left until it stops. Press the catch in between these two locks.

VRS®-T joint DN 80 to DN 250 with high-pressure lock

+ VRS®-T EPDM gasket ring according to EN 681-1
+ 1 high-pressure lock
+ 1 lock, right (black)
+ 1 lock, left (red)
+ 1 catch

If very high internal pressures are expected (e.g. for turbine pipes) or trenchless installation procedures are used (e.g. relining, horizontal directional drilling, pressing, pulling or rocket ploughing methods), a high-pressure lock must also be used. The high-pressure lock is inserted through the socket opening into the retaining chamber and positioned at the bottom before the left and right locks are inserted. Now the locks can be inserted so that the high-pressure lock is between their smooth ends. Then the locks can be fixed as usual with the catch.

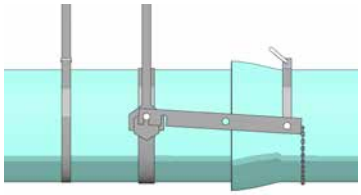
VRS®-T joint DN 300 to DN 500

+ VRS®-T EPDM gasket ring according to EN 681-1
+ 2 locks, right (black)
+ 2 locks, left (red)
+ 2 catches

Insert the lock on the right (black) into one of the socket openings and push it to the right until it stops. Then insert the lock on the left (red) and push it to the left until it stops. Press the catch in between these two locks. Do the same in the second socket opening.

Locking the joint

Pull the pipe out of the socket or press it out until the locks in the retaining chamber come into contact with it.
The joint is now restrained.



Bending the joint

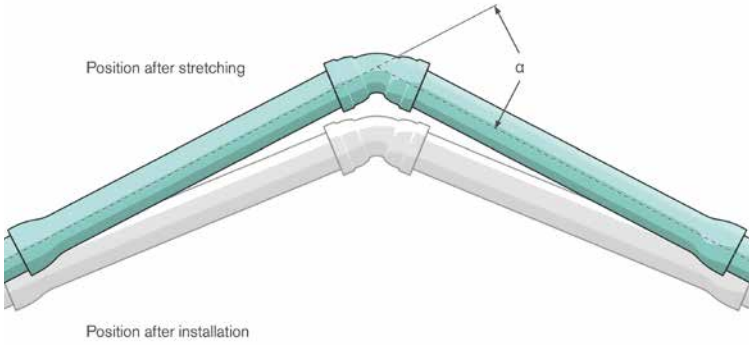
Once the joint has been secured, the pipes and fittings can be bent:

+ DN 80 to 150 – max. 5°
+ DN 200 to 300 – max. 4°
+ DN 400 to 500 – max. 3°

With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

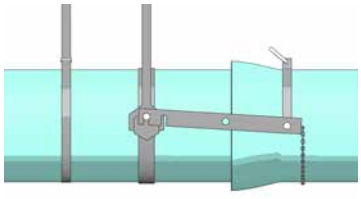
Assembly instructions

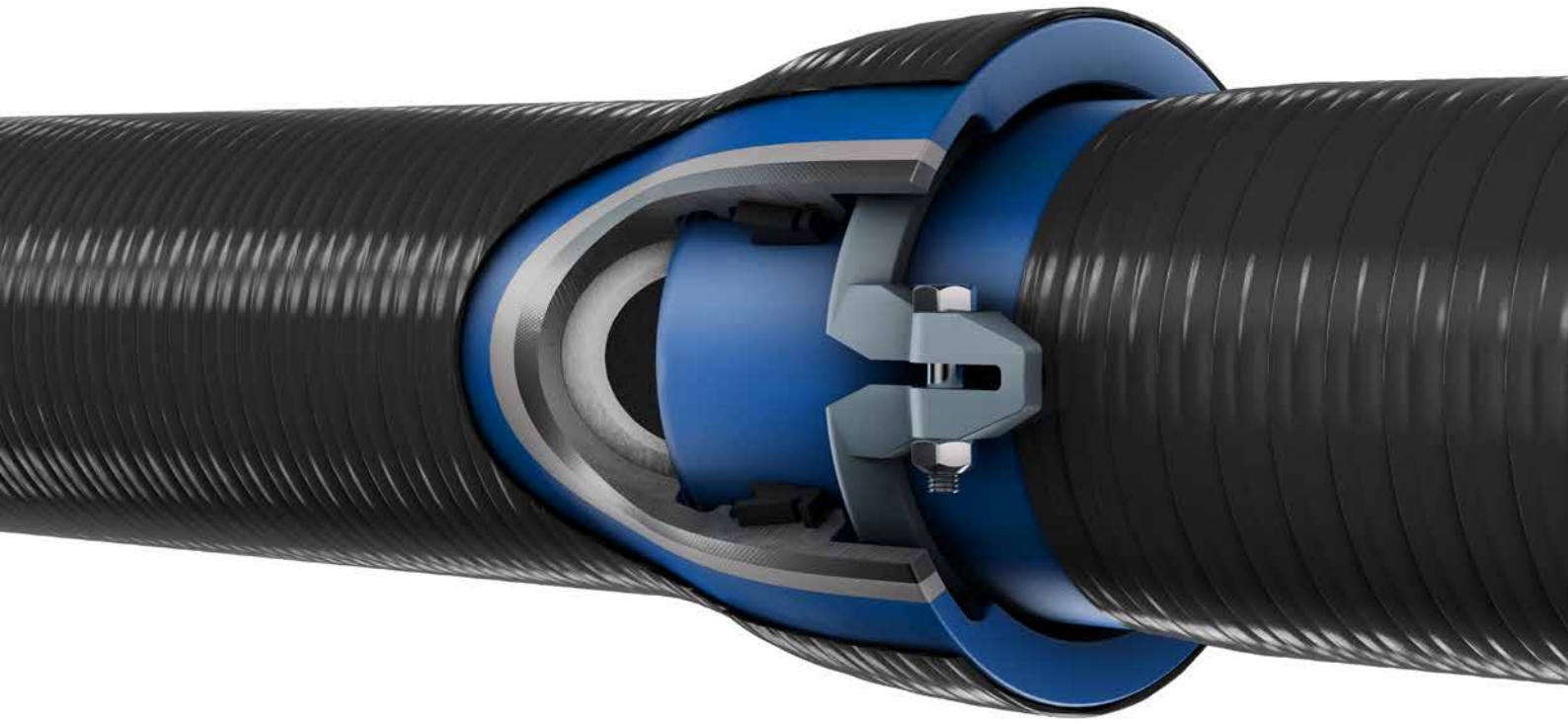
Please note that depending on the internal pressure and the joint tolerances, stretching of up to approx. 8 mm can occur for each joint. To take into account the stretching path of the pipe during pressure application, the joints at the bends are set negatively with the max. allowable bend.



Disassembly

Push the pipe horizontally into the socket until it stops. Remove the catch from the socket opening. Move the lock and remove it from the socket opening. If available, use a flat object (e.g. a screwdriver) to push the high-pressure lock out of the bottom to the socket opening and remove it. The pipe can then be disassembled.





VRS®-T joint with clamping ring DN 80 to DN 500

Installation instructions for VRS®-T joint with clamping ring

DN 80 to DN 500

Clamping rings are used to make restrained locking systems with VRS®-T plug-in sockets. They are used for pipes that are cut on site, and have the advantage of not requiring a weld bead to be applied to the spigot on site. They can be used for pipe dimensions from DN 80 to DN 500

⚠ When installing clamping rings, care should be taken to ensure that they are only installed in pipe sockets as far as possible.

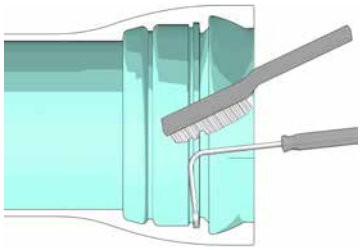
Instructions for installing clamping ring joints

Clamping ring joints must not be used in above-ground pipes, in pipes subject to pulsation, or in trenchless installation methods.
In MK, MMK, MMQ, EN or ENQ fittings, the maximum PFA is 16 bar. For these exceptional applications, the required customized pipes with a welding bead for VRS®-T joints must be installed. GDR fittings can also be used.

⚠ Higher PFA in consultation with application engineering.

Cleaning the joint parts

The gasket seat, retaining groove and shank must be kept clean. A special scraper or a bent screwdriver is recommended for cleaning the retaining groove.



Position of the socket openings in pipe trenches DN 80 to DN 250

To insert the clamping ring, we recommend that the socket openings be positioned as shown. Where the fittings should be positioned is determined by the circumstances of each installation.

Position of the socket openings in pipe trenches DN 300 to DN 500

Cleaning the gasket

Clean the gasket, check for damage and press it together to form a heart shape.

Inserting the gasket

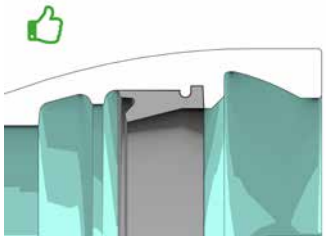
Insert the gasket into the socket so that the outer hard rubber claw engages in the retaining groove of the socket. Then smooth out the loop.

Smoothing out the gasket

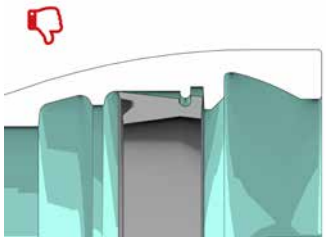
If smoothing the loop causes problems, pull out a second loop on the opposite side. These two small loops can then be smoothed easily.

Gasket seat

The inner hard rubber edge of the seal should not project over the centering collar.



Gasket in wrong position



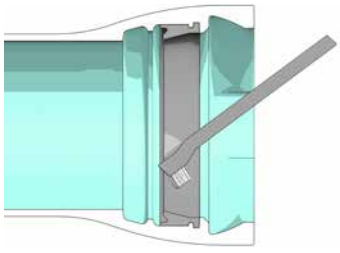
Marking the insertion depth

Mark the insertion depth (socket depth) at the shank.

Lubricants

Apply a thin coat of lubricant to the tight-fitting gasket and the cleaned shank, especially at the bevel.

⚠ In case of frost or high heat, the lubricant and the gaskets must be stored together in one room.



Inserting a clamping ring

Inserting the split clamping ring. First insert the two halves of the clamping ring separately into the retaining chamber and then connect them loosely with the two bolts.

Securing the joint

Keep the clamping ring apart. Pull or push the shank in until it stops. The previously applied marking on the shank should be almost congruent with the front of the socket after insertion.

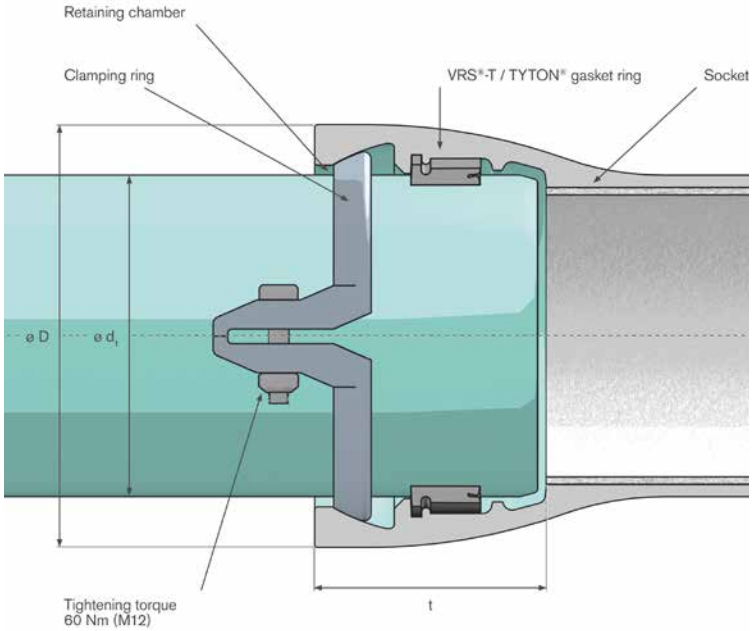
⚠ Insert or push in the straight (axial) shank.

Tightening the clamping ring bolts

Pull the clamping ring as straight as possible towards the front of the socket and then tighten the bolts with **60 Nm**.

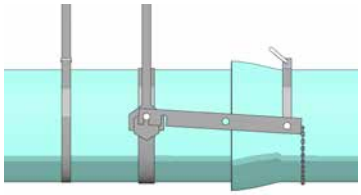
⚠ Clamping rings must not be mounted at an angle on the pipe!

⚠ If clamping rings are mounted at an angle, they might be pushed into a straight position by the internal pressure (load). The clamping effect would then be lost and the joint would no longer be restrained.



Locking the joint

Pull the pipe out of the socket or press it out until the clamping ring in the retaining chamber comes into contact with it. The joint is now restrained.



Bending the joint

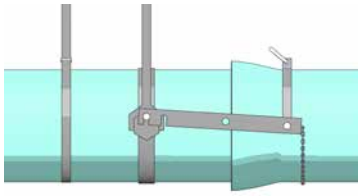
Once the joint has been secured, the pipes and fittings can be bent:

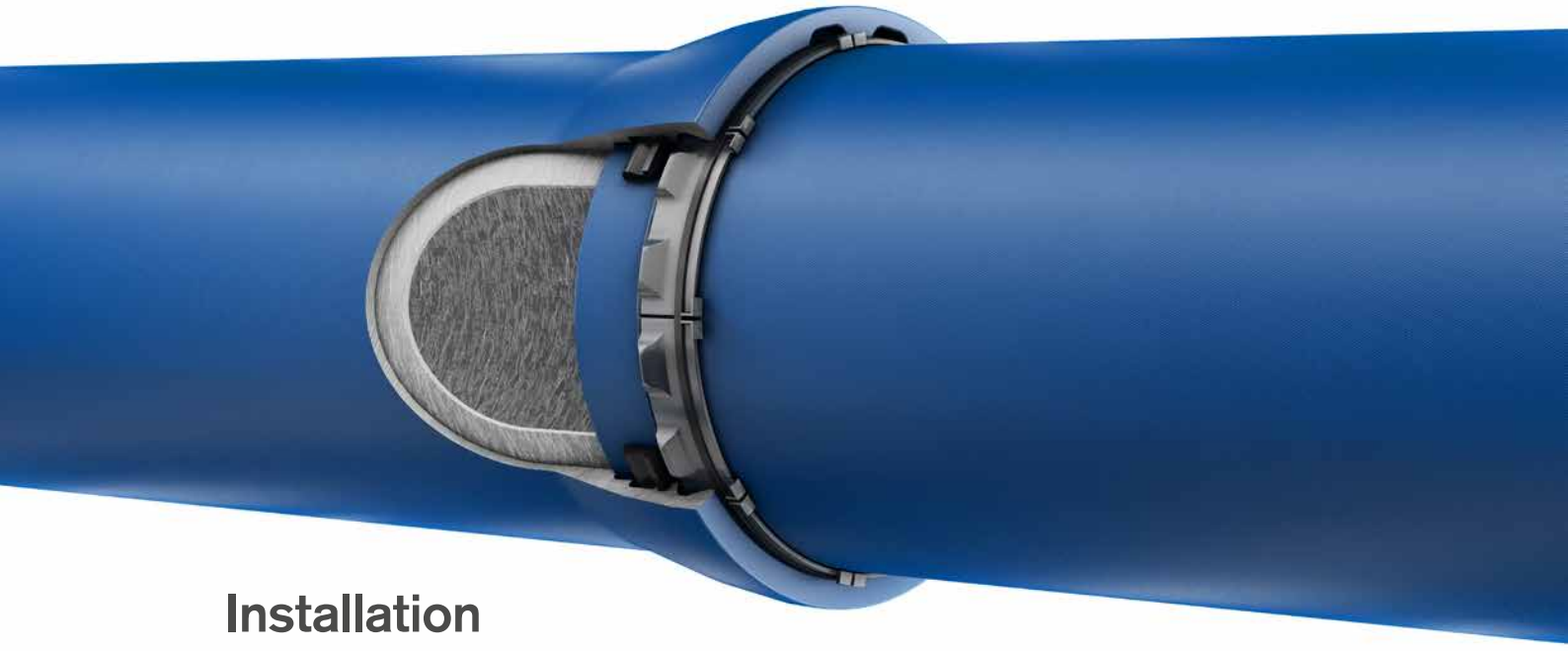
+ DN 80 to 150 – max. 5°
+ DN 200 to 300 – max. 4°
+ DN 400 to 500 – max. 3°

With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

Disassembly

Push the pipe horizontally into the socket until it stops. After removing the clamping bolts, loosen the pipe clamp halves by hitting them with a hammer. During disassembly, keep checking the open position of the pipe clamp halves (you may have to hit them with a hammer when pulling out the shank).
Clamping a square iron between the clamping straps can also prevent the shanks getting caught during disassembly. Never strike the socket or pipe shaft with a hammer!





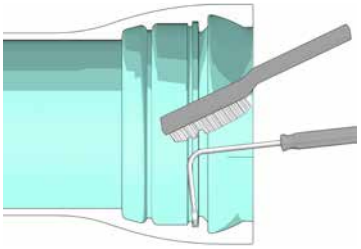
Installation instructions for VRS®-T joints

DN 600 to DN 1000

These installation instructions apply to ductile iron pipes and fittings with VRS®-T restrained locking systems DN 600 to DN 1000.

Cleaning the joint parts

The gasket seat, retaining groove, retaining chamber, locking segments and shank must be kept clean.
A special scraper or a bent screwdriver is recommended for cleaning the retaining groove.



Position of the socket opening in the pipe trench

The socket opening on the front of the socket should always be located in the pipe crown.

Cleaning the gasket

Clean the gasket, check for damage and press it together to form a heart shape.

Inserting the gasket

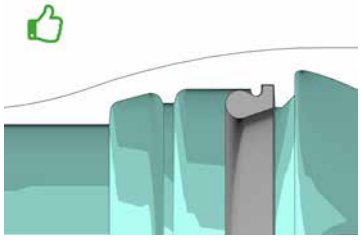
Insert the gasket into the socket so that the outer hard rubber claw engages in the retaining groove of the socket. Then smooth out the loop.

Smoothing out the gasket

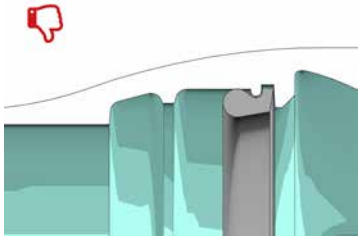
If smoothing the loop causes problems, pull out a second loop on the opposite side. These two small loops can then be smoothed easily.

Gasket seat

The inner hard rubber edge of the seal should not project over the centering collar.



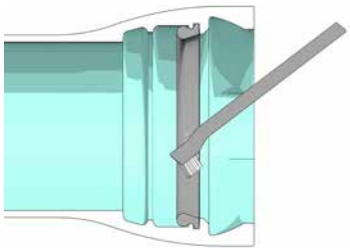
Gasket in wrong position



Lubricants

Apply a thin coat of lubricant to the tight-fitting gasket and the cleaned shank, especially at the bevel.

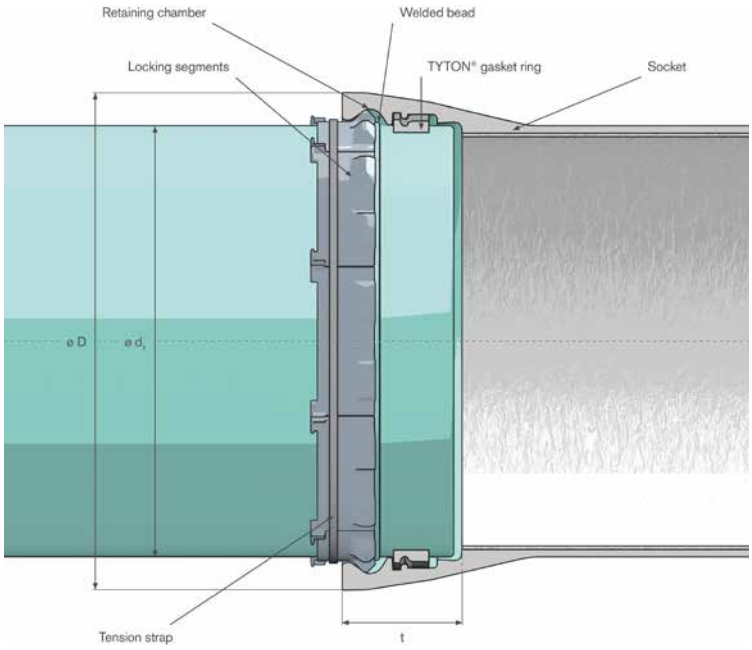
⚠ In case of frost or high heat, the lubricant and the gaskets must be stored together in one room.



Securing the joint

Pull or push the shank in until it stops.

- ⚠ Insert or push in the straight (axial) shank.
- ⚠ Bending must be avoided during assembly.



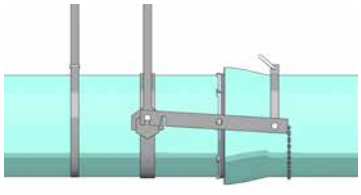
VRS®-T joint DN 600

Insert the locking segments through the socket opening and distribute them alternately left/right around the circumference of the pipe. Then move all segments to one side so that the last segment can be inserted through the socket opening and moved into a lockable position. The last locking segment may protrude so that it can just be seen in the socket opening. If segments are to be clamped, they must be moved into their intended position by moving the pipe hanging from the belt by lightly tapping it with a hammer.

- ⚠ Insert or push in the straight (axial) shank.
- ⚠ Bending must be avoided during assembly.
- ⚠ Never hit the socket or pipe shaft with a hammer.

Locking the joint

Pull all locking segments back outwards until they stop against the retaining chamber. Then attach the tension strap over the segments. Ensure the tension strap is not too tight so that the locking segments can still be moved. Now align the locking segments so that they are in full contact with the pipe shaft and are not overlapped. Then tighten the tension strap so that the locking segments are tight around the entire circumference of the pipe. The locking segments can no longer be moved. Pull the pipe out of the socket or press it out until the locks in the retaining chamber come into contact with it. The joint is now restrained.



- ⚠ For all trenchless installation methods, a metal clip is used instead of a tension strap.

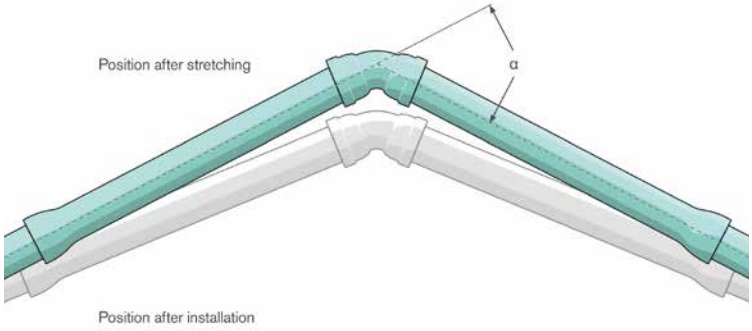
Bending the joint

Once the joint has been secured, the pipes and fittings can be bent:
+ DN 600 - max. 2°

With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

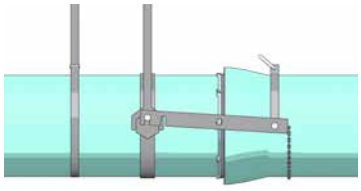
Assembly instructions

Please note that depending on the internal pressure and the joint tolerances, stretching of up to approx. 8 mm can occur for each joint. To take into account the stretching path of the pipe during pressure application, the joints at the bends are set negatively with the max. allowable bend.

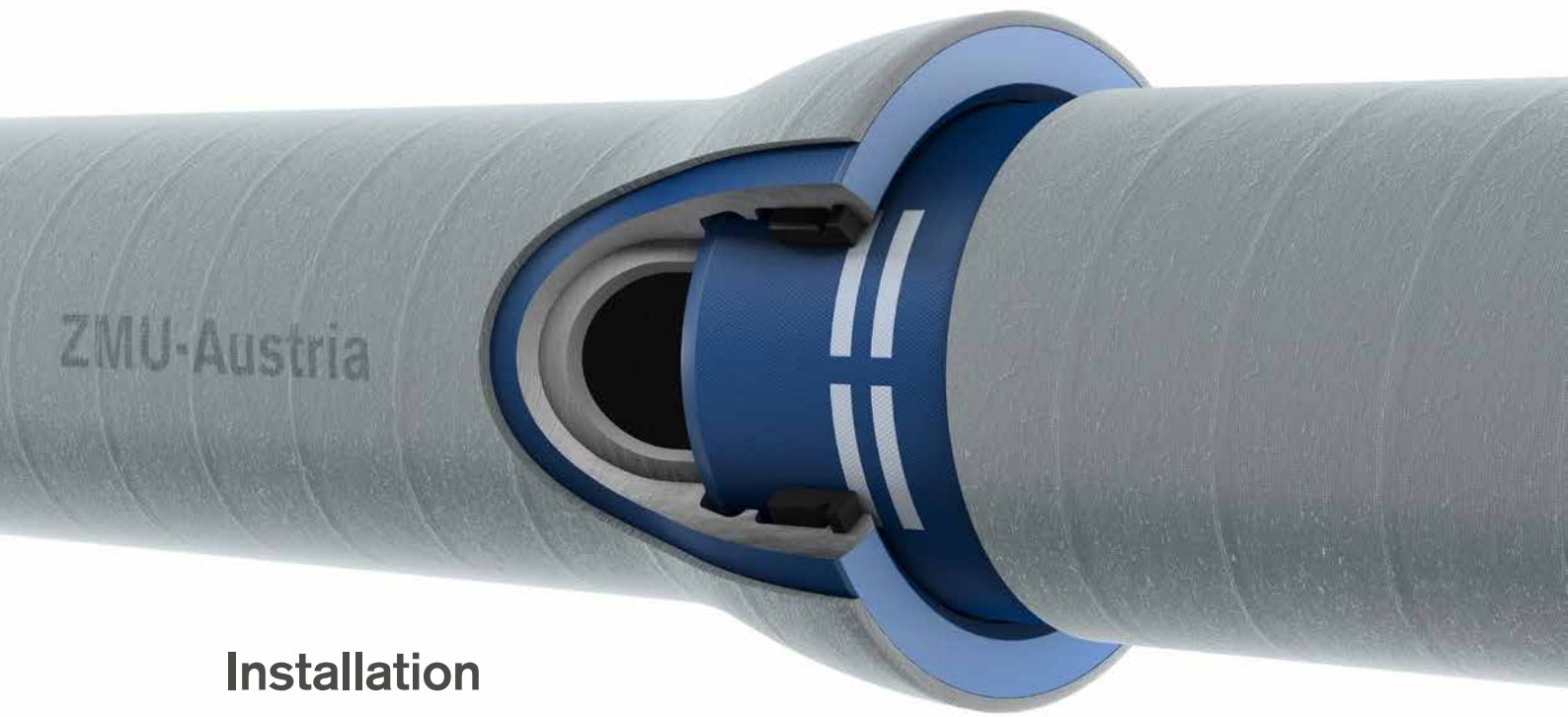


Disassembly

Push the pipe horizontally into the socket until it stops. Loosen the tension strap and move the locking segment towards the socket opening by tapping with a hammer. Then move the locking segments one after the other towards the socket opening and remove them. The pipe can then be disassembled.



⚠ Never hit the socket or pipe shaft with a hammer.



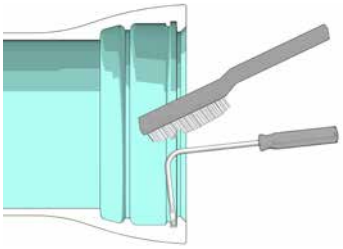
Installation
Instructions for TYTON® joints

DN 80 to DN 1000

These installation instructions apply to ductile iron pipes and fittings according to EN 545 with TYTON® non-restrained locking systems DN 80 to DN 1000.

Cleaning the joint parts

The gasket seat, retaining groove, retaining chamber, lock and shank must be kept clean.
A special scraper or a bent screwdriver is recommended for cleaning the retaining groove.



Cleaning the gasket

Clean the gasket, check for damage and press it together to form a heart shape.

Inserting the gasket

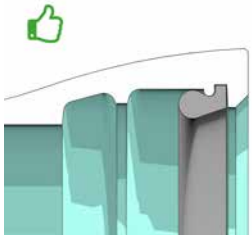
Insert the gasket into the socket so that the outer hard rubber claw engages in the retaining groove of the socket. Then smooth out the loop.

Smoothing out the gasket

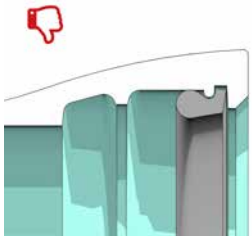
If smoothing the loop causes problems, pull out a second loop on the opposite side. These two small loops can then be smoothed easily.

Gasket seat

The inner hard rubber edge of the seal should not project over the centering collar.



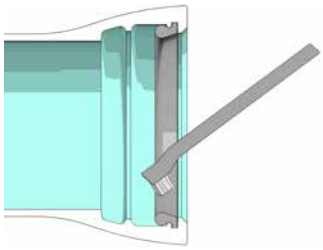
Gasket in wrong position



Lubricants

Apply a thin coat of lubricant to the tight-fitting gasket and the cleaned shank, especially at the bevel. Apply some lubricant behind the gasket as well.

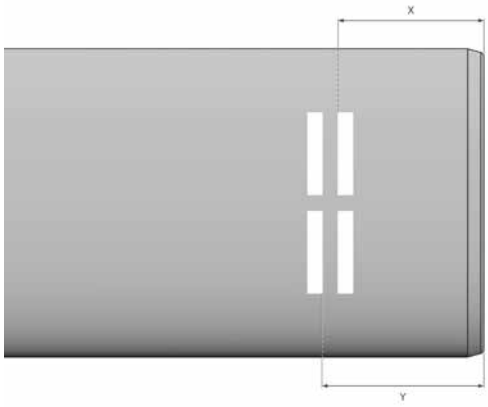
⚠ In case of frost or high heat, the lubricant and the gaskets must be stored together in one room.



Securing the joint

Insert or push the shank into the socket until the first marking line is no longer visible.

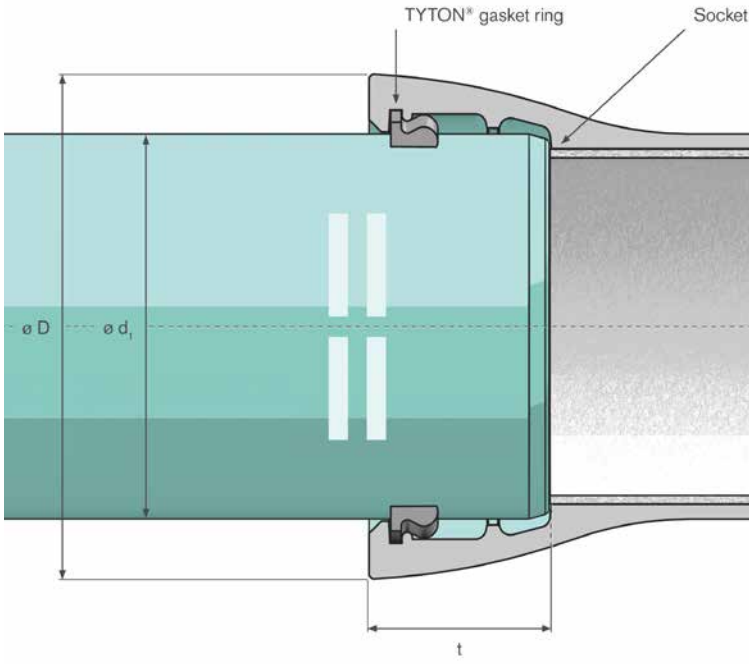
- ⚠ Insert or push in the straight (axial) shank.
- ⚠ Bending must be avoided during assembly.



TYTON® joint DN 80 to DN 1000

+ TYTON® EPDM gasket ring according to EN 681-1

After securing the joint, check that the gasket is sitting correctly around the entire circumference using the surface feeler.
The entire circumference should be penetrated evenly and deeply into the gap between the shank and the front of the socket. If it is possible to penetrate deeper at one or more points, the gasket may have been pushed out of the retaining groove at these points and leakages may occur. In this case, the joint must be disassembled and the gasket seat checked.



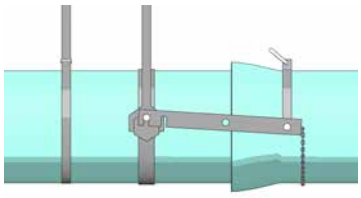
Bending the joint

Once the joint has been secured, the pipes and fittings can be bent:

+ DN 80 to 300 – max. 5°
+ DN 400 – max. 4°
+ DN 500 to 1000 – max. 3°

With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

Disassembly



The pipe can be disassembled without any special tools.
Simply push or pull the pipe apart.

Gasket according to EN 1514-1

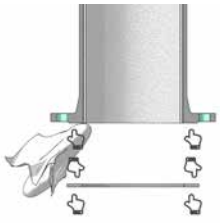
Bolt set

Installation instructions for flange joints

DN 80 to DN 1000

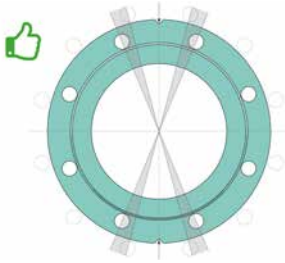
Cleaning the joint parts

The sealing strip, gasket and bolt holes must be cleaned and any accumulations of paint removed.



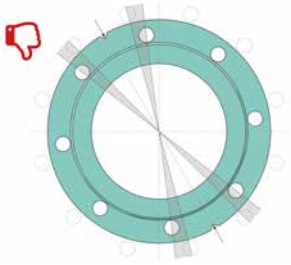
Position of the flange joint

To facilitate correct assembly, two opposing notches are provided on the flanges of the fittings. These must be aligned vertically or horizontally during installation.



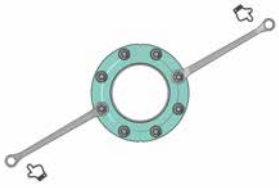
Arranging the bolt holes

For flange pipes and flange fittings, for the arrangement of the bolt holes the rule is that no bolt holes can fall into the flange axis perpendicular to the pipe level.



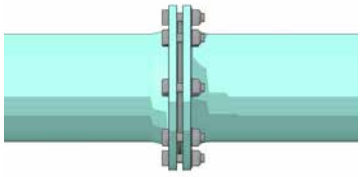
Securing the joint

Flanged pipes and fittings must be carefully supported. Different loads and settlements cannot be absorbed by rigid pipe connections. The pipes and fittings must under no circumstances be supported with stones and other materials. Always use a ring wrench to tighten two opposite nuts one after the other by about half a turn to one complete turn.



⚠ Washers must be used.

Flange joint DN 80 to DN 1000



Bolt dimensions according to FGR/EADIPS Standard 30:

+ Hex bolts according to DIN EN ISO 4016, quantity depending on diameter and pressure rating.
+ Nuts according to DIN EN ISO 4034
+ Washers according to DIN EN ISO 7091

Rubber gasket with steel insert according to DIN EN 1514-1

⚠ For better installation and operational safety, only flat gaskets with steel inserts should be installed.

Tightening torque

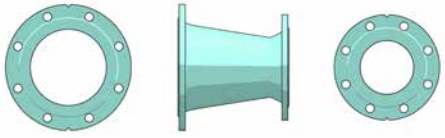
The tightening torque MD depends on the sealing material, the nominal diameter DN and the nominal pressure PN.

It can be calculated as follows:
MD for PN 10 = DN/3.00 [Nm]
MD for PN 16 = DN/1.50 [Nm]
MD for PN 25 = DN/1.00 [Nm]
MD for PN 40 = DN/0.50 [Nm]

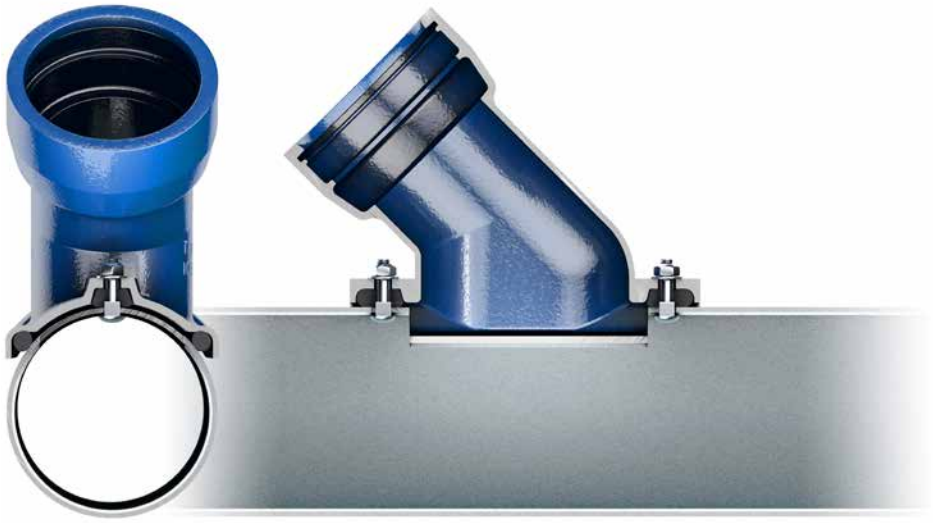
Example Tightening torque for flange DN 200 PN 25
MD for PN 25 = DN/1.00 = 200/1.00 = 200 Nm

Installing FFR fittings

Due to the different number of bolt holes in FFR fittings, the adjacent valves or fittings will be skewed in the area if they are incorrectly installed. The degrees of twist can be up to 22.5° (depending on nominal diameter).



⚠ Degrees of twist hardly perceptible with large nominal diameters.



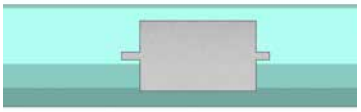
Installation instructions for pipe-connection fittings

These installation instructions apply to ductile iron pipe-connection fittings according to EN 598 with TYTON® non-restrained locking systems.

Gluing the cutting template

Glue the cutting template onto the shaft of the ductile sewage pipe.

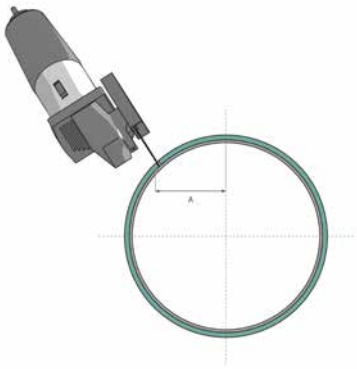
⚠ Ensure that the longitudinal axis of the pipe and the template are parallel to each other.



Cutting out the opening using the template

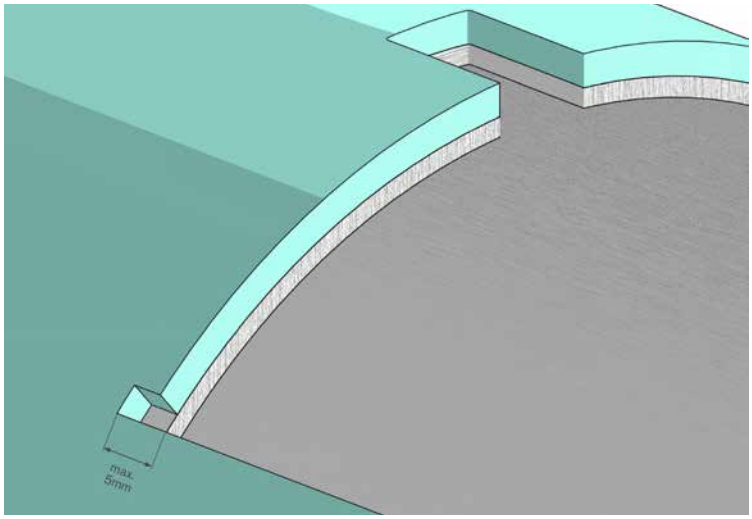
Use an angle grinder and a stone or diamond cut-off wheel to cut out the rectangular surface formed by the white marking lines of the template. You can make an inclined cut (perpendicular to the pipe surface) to prevent the cut-off wheel from slipping.

⚠ The marking lines indicate the outer edge of the flat joint!



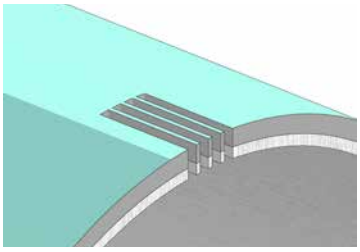
Flat joint

In the corners, a longitudinal overcut of max. 5 mm is allowable to facilitate waste removal.



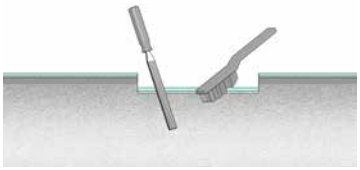
Notching grooves

The marked grooves can be notched by repeated grooving with the cut-off wheel. The marked grooves should not be too large, as otherwise the square will rotate.



Smoothing the cutting edges

After removing the waste from the inside of the pipe, remove the rest of the cutting template from the pipe shaft and deburr the cutting edges with a coarse file or a hand angle grinder with grinding disk. Seal the cut surfaces with our repair material PU-Repair.

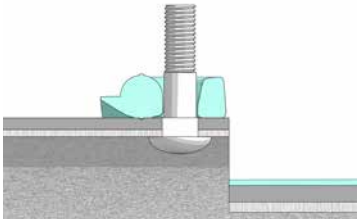


Frame gasket

Lubricate the frame gasket and position it on the pipe shaft with the cone facing upwards.

Round-head bolts

Insert the round-head bolts from below through the opening of the frame gasket and into the groove. Pull the round-head bolts upwards and position them so that the square neck is secured against twisting in the grooves.



Lubricants

Completely lubricate the underside of the pipe-connection fitting around the sealing surface.

Installing the pipe-connection fitting

Fit the pipe-connection fitting and attach the nuts. Tighten the nuts (SW 24) evenly – the tightening torque should be at least 30Nm.

- ⚠ Check that the frame gasket fits exactly, especially on the long sides.
- ⚠ Throughout the entire assembly process, care must be taken to avoid dirt and dust while working

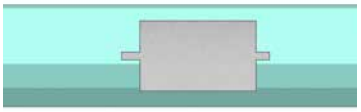
Installation instructions for pipe-cleaning fittings

These installation instructions apply to ductile iron pipe-cleaning fittings according to EN 598.

Gluing the cutting template

Glue the cutting template onto the shaft of the ductile sewage pipe.

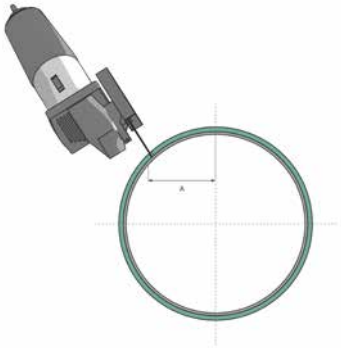
⚠ Ensure that the longitudinal axis of the pipe and the template are parallel to each other.



Cutting out the opening using the template

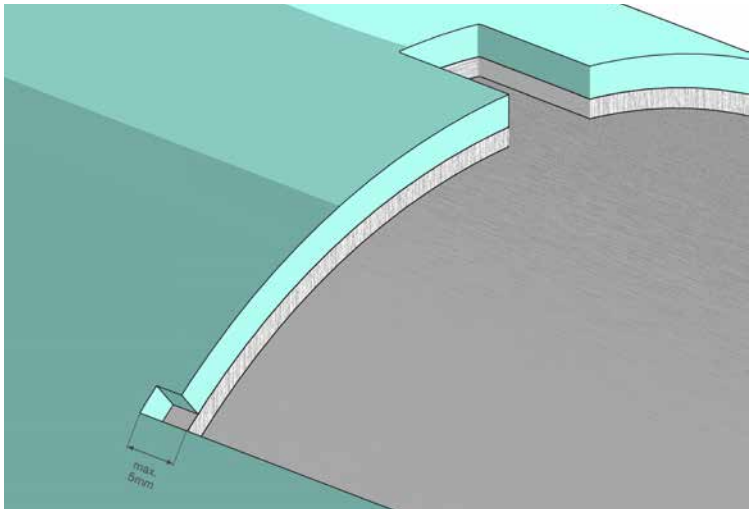
Use an angle grinder and a stone or diamond cut-off wheel to cut out the rectangular surface formed by the white marking lines of the template. You can make an inclined cut (perpendicular to the pipe surface) to prevent the cut-off wheel from slipping.

⚠ The marking lines indicate the outer edge of the flat joint!



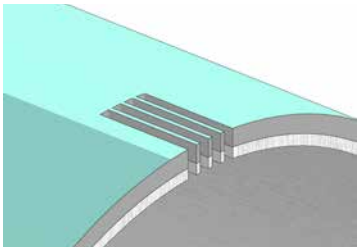
Flat joint

In the corners, a longitudinal overcut of max. 5 mm is allowable to facilitate waste removal.



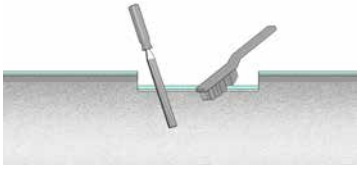
Notching grooves

The marked grooves can be notched by repeated grooving with the cut-off wheel. The marked grooves should not be too large, as otherwise the square will rotate.



Smoothing the cutting edges

After removing the waste from the inside of the pipe, remove the rest of the cutting template from the pipe shaft and deburr the cutting edges with a coarse file or a hand angle grinder with grinding disk. Seal the cut surfaces with our repair material PU-Repair.

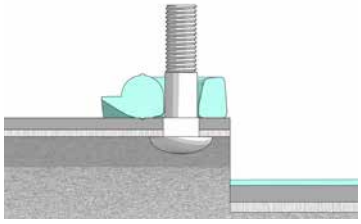


Frame gasket

Lubricate the frame gasket and position it on the pipe shaft with the cone facing upwards.

Round-head bolts

Insert the round-head bolts from below through the opening of the frame gasket and into the groove. Pull the round-head bolts upwards and position them so that the square neck is secured against twisting in the grooves.



Lubricants

Completely lubricate the underside of the pipe-cleaning fitting around the sealing surface.

Installing the pipe-cleaning fitting

Fit the pipe-cleaning fitting and attach the nuts. Tighten the nuts (SW 24) evenly – the tightening torque should be at least 30Nm. With additional clamp for pump lines up to 6-bar operating pressure.

- ⚠ Check that the frame gasket fits exactly, especially on the long sides.
- ⚠ Throughout the entire assembly process, care must be taken to avoid dirt and dust while working

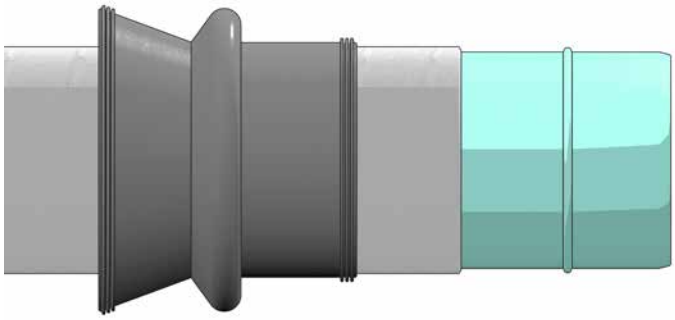
Installation instructions for protective sleeves

These installation instructions apply to ductile iron pipes and fittings according to EN 545 and ÖNORM B 2597 with VRS®-T joints or TYTON® joints DN 80 to DN 1000.

Before assembling the joint

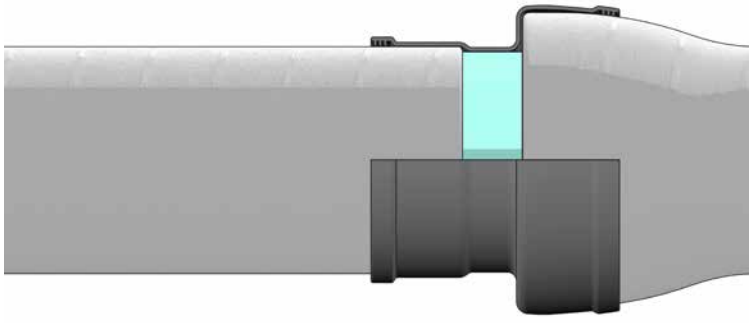
Turn the sleeve over and pull it over the shank with the larger diameter at the front so that the ZMU-Austria coating or PUR-TOP impact protection strip protrudes approx. 100 mm.

⚠ Assembly can be facilitated by using lubricants on the ZMU-Austria coating.



After assembling the joint

Fold the sleeve down, pull it to the front of the socket and put it over the socket. It will then lie tightly and firmly.

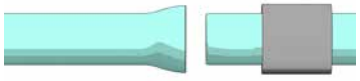


Installation instructions for shrink sockets

These installation instructions apply to ductile iron pipes and fittings according to EN 545 and ÖNORM B 2597 with VRS®-T joints or TYTON® joints DN 80 to DN 1000.

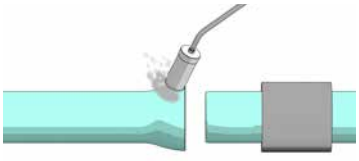
Before assembling the joint

Pull the shrink socket over the socket end.



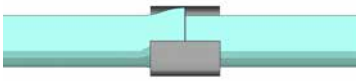
Cleaning the surface

Secure the socket joint according to the installation instructions. Then prepare the surface to be covered according to data sheet GW 150, i.e. remove rust, grease, dirt and all loose particles from the installation area. Use the propane gas flame to preheat the surface to approx. 60°C and dry it.



Positioning the shrink socket

Pull the shrink socket over the joint so that about half of the length is on the socket.



Removing the protective insert

After positioning the shrink socket, remove the protective insert.

Shrinking

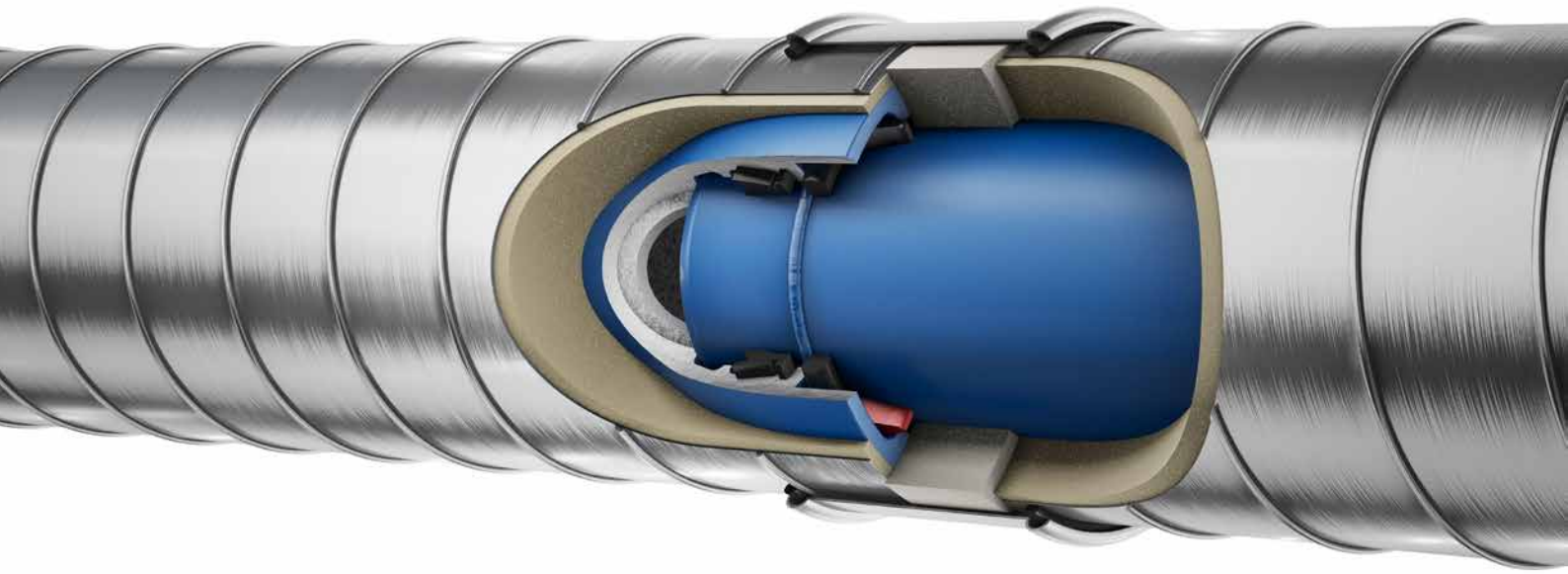
Use a soft propane gas flame to heat the shrink socket evenly all around at the level of the front of the socket until it begins to shrink and the socket contour becomes apparent. Then maintain an even temperature and shrink first the socket component and then the pipe shaft component, starting from the socket end.

⚠ Fan the burner in the circumferential direction.

Checks

The process was carried out correctly if:

+ the socket/sleeve is completely shrunk onto the pipe joint,
+ it is smooth, without cold spots or air bubbles,
+ the gasket adhesive was pressed out at both ends,
+ the required overlap of 50 mm on the factory coating was maintained.



Installation instructions for WKG pipes

Above-ground pipes
FL system
(spiral casing pipe)

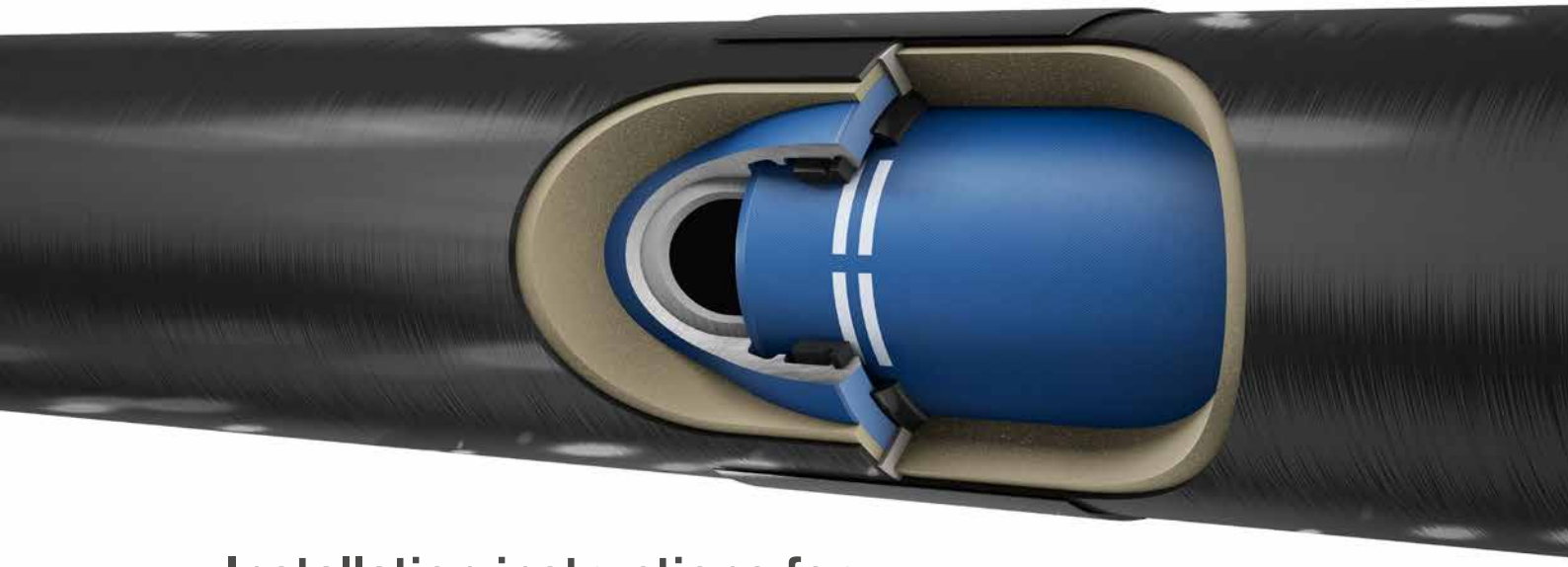
These installation instructions apply to thermally insulated ductile iron pipes and fittings. For the production of pipe joints, please refer to the respective applicable installation instructions.

Inserting soft polyethylene (WPE)

Once the joint has been assembled or locked, one or more soft polyethylene (WPE) rings can be inserted into the remaining gap between the shank and the front of the socket, depending on the type of connection (TYTON, VRS®-T).

Sealing with a sheet metal socket

Seal the joint with a sheet metal socket. For this purpose, the customer inserts a supplied elastic sealing tape into the beads of the sheet metal socket. The sheet metal socket is fixed in the middle above the joint with sheet-metal bolts.



Installation instructions for WKG pipes

Buried pipes
EL system
(PE-HD casing pipe)

These installation instructions apply to thermally insulated ductile iron pipes and fittings. For the production of pipe joints, please refer to the respective applicable installation instructions.

Before assembling the WKG-EL joint

Slide the shrink socket and sleeves onto a pipe with packing before assembling the joint.

Cleaning the WKG-EL surface

Secure the socket joint according to the installation instructions. Then prepare the surface to be covered at least 150 mm from both sides of the casing pipe ends according to data sheet GW 150, i.e. remove rust, grease, dirt and all loose particles from the installation area. Use the propane gas flame to preheat the surface to approx. 60°C and dry it.

Activating casing pipes and gluing sealing tapes

Activate the casing pipes at least 150 mm from both pipe ends until the surface has a silky shine.
Approx. 20 mm from the edges of the casing pipe, guide the sealing tapes around the casing pipe.

Position and shrink the shrink socket on

Remove the shrink socket packaging. Ensure that the socket is clean and dry on the outside and inside. Place the socket over the joint. Check the seat and remove the paper from the sealing tapes. Shrink the outer 100 mm of both ends, at least until the sealing tape is visible below.

Shrinking the sleeve on

Remove the sleeve packaging and protective film. Ensure that the protective film is completely removed. During shrinking, ensure that the sleeve is above the end of the socket. Do the same with the other sleeve.

Foaming the socket with PUR components

Drill a hole (with a special drill) in the middle of the socket.
Foam the socket with PUR components. Mount the stopper and completely tighten it when the foam emerges.

Completing the process

Remove the escaping foam.
Activate approx. 200 mm in the stopper area around the socket.
Place the sleeve directly above the stopper and shrink it on.

⚠ For specific processing information, consult the WKG coating manufacturer (e.g. KE KELIT).

Information about WKG pipes

Supports and downtimes

WKG pipes can also be suspended as above-ground pipes with supports.Downtimes are crucial, especially at low outside temperatures. The following tables list the insulation thicknesses required for the various applications.

Supports for above-ground pipes

Plain bearing with lift lock for dowel-fixing or mounting on brackets, for mounting on bridges, for WKG pipes according to static requirements (e.g. Huckenbeck, delivery on-site).

Downtimes for pipes when fully filled (water temperature 8°C) [a]

Above-ground pipes: FL spiral casing pipes

Carrier pipe DN	Insulation thickness [mm] sD	External temperature -20°C		External temperature -30°C	
		up to 0°C [h]	up to 25% ice [h]	up to 0°C [h]	up to 25% ice [h]
80	41	10	21	7	14
100	41	12	28	9	19
125	40.5	16	39	11	26
150	40	20	49	14	32
200	46.5	31	80	22	53
250	63	51	135	36	90
300	62	62	167	44	111
400	65.5	89	241	63	161
500	89	150	410	106	273
600	82.5	172	472	120	315
700	81	199	> 500	140	366
800	79	224		157	415

[a] For other external temperatures, please contact our application engineering department.

Downtimes for pipes when fully filled (water temperature 8°C) [a]

Buried pipes at risk from frost: EL-PE-HD casing pipe

Carrier pipe DN	Insulation thickness [mm] sD	max. frost depth 1.4 m			
		Covering 0.3 m		Covering 0.5 m	
		up to 0°C [h]	up to 25% ice [h]	up to 0°C [h]	up to 25% ice [h]
80	41	24	68	32	102
100	41	31	94	41	142
125	40.5	40	130	53	196
150	40	49	169	64	254
200	46.5	76	292	100	440
250	63	125	> 500	164	> 500
300	62	151		199	
400	65.5	214		282	
500	89	447		> 500	
600	82.5	> 500			
700	81				
800	79				

[a] For other frost depths and covers, please contact our application engineering department.

Installation instructions for bolted-gland socket joints

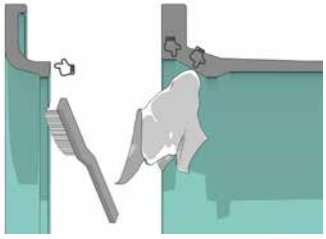
DN 80 to DN 1000

These installation instructions apply to ductile iron fittings according to ÖNORM EN 545 and ÖNORM EN 598 with bolted-gland socket joints according to DIN 28 602. For recommendations for installation, see the Construction Site Manual.

Cleaning the joint parts

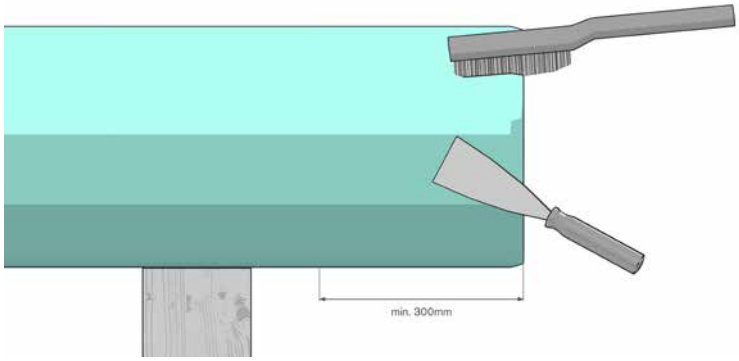
The surfaces marked with an arrow on the gasket seat must be cleaned and any accumulations of paint removed.
The front pressure surface of the gland ring is easy to clean.

⚠ The gasket seat can be cleaned with a brush, for example.



Cleaning the shank

Clean the shank to a length of at least 300 mm. Remove impurities and any ink residues.



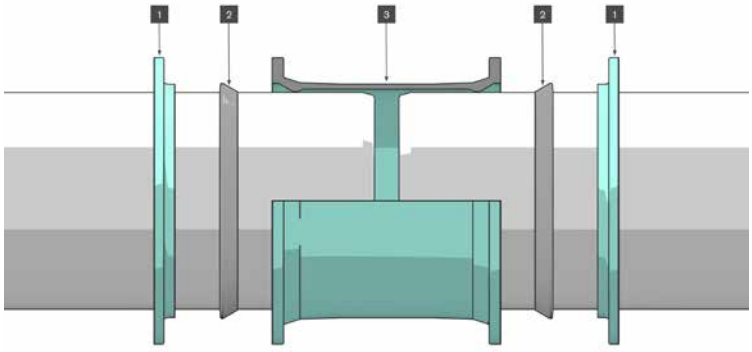
Marking the insertion depth

To check the insertion depth later, mark the distance at the shank.
See table.

Pushing the connecting parts on

Push the gland ring and gasket, with the tip towards the socket, onto both shanks.
Push the gland to one side.
Use a lifting device to insert the shank into the socket, center it and check the installation depth.

⚠ Do not use lubricant!



1 gland ring, 2 gasket, 3 gland

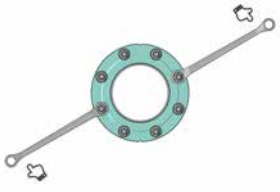
Aligning the SMU joint parts

Use a lifting device to insert the shank into the socket, center it and check the installation depth.
Press the gasket evenly deep into the sealing chamber.
Push the gland ring in front of the gasket and align with two hardwood wedges, which can be easily inserted between the gland ring and the shank at the top.

⚠ If the gland ring is well centered, it will then be easy to insert the T-head bolts.

Inserting the bolts

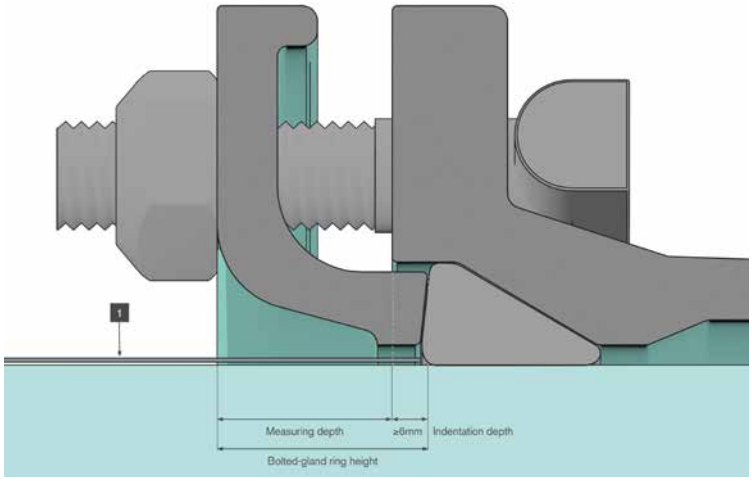
Insert T-head bolts into gland flange and gland ring. Screw the nuts on by hand evenly as far as possible. Always use a ring wrench to tighten two opposite nuts one after the other by about half a turn to one complete turn.



⚠ Do not remove the lifting device until the joint has been secured.

Securing the joint

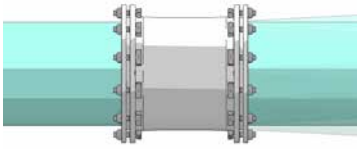
The seal is correctly grouted when the gland ring is pressed at least 6 mm deep into the gasket. The indentation depth can be determined by measuring the gland ring height and the depth from the outer edge of the gland ring to the gasket after tightening the bolts.
The indentation depth should be as equal as possible in relation to the respective bolted-gland socket joint. At least 3 measurements are therefore required at each joint.



1 steel tape measure

- ⚠ Check again that the installation depth is correct.
- ⚠ Paint T-head bolts and nuts with socket varnish or PU-Repair.
- ⚠ After 24 hours or after the pressure test, check again that the nuts are sitting tightly. If necessary, readjust them.

Bending the joint



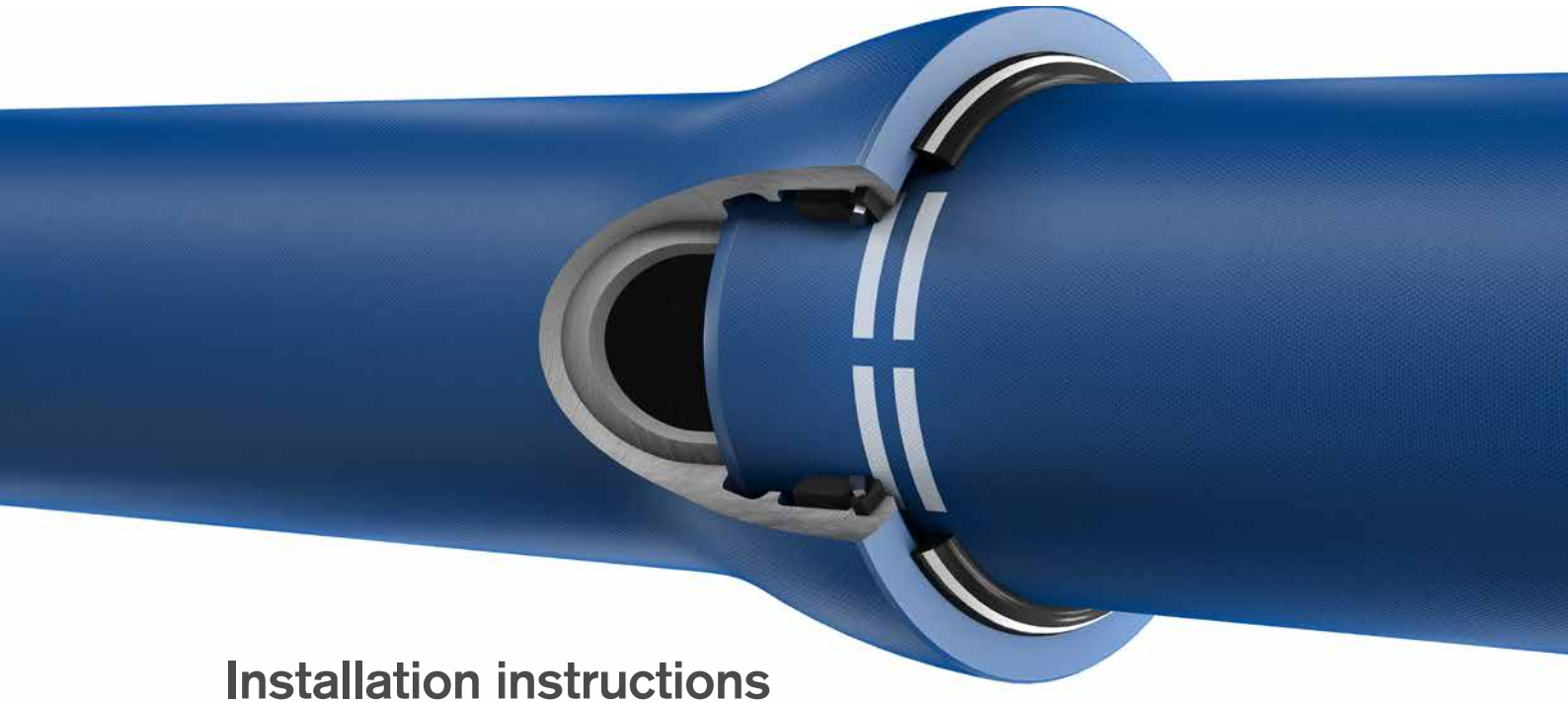
Once the joint has been secured in a centric position, the pipes and fittings can be bent:

+ DN 80 to DN 500 – max. 3°
+ DN 600 to DN 700 – max. 2°
+ DN 800 to DN 1000 – max. 1.5°

With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

Disassembly

Loosen the nuts, remove the gland ring. Pull the shank out of the socket.



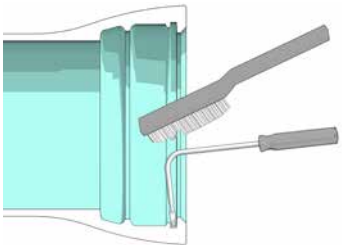
Installation instructions for TYTON®-SIT-PLUS joints

DN 80 to DN 600

These installation instructions apply to ductile iron pipes and fittings according to EN 545 with TYTON®-SIT-PLUS restrained locking systems 80 to DN 600.

Cleaning the joint parts

The gasket seat, retaining groove, retaining chamber, lock and shank must be kept clean.
A special scraper or a bent screwdriver is recommended for cleaning the retaining groove.



Cleaning the gasket

Clean the gasket with stainless steel segments, check for damage and press it together to form a heart shape.

⚠ The inner loop must be between two segments.

Inserting the gasket

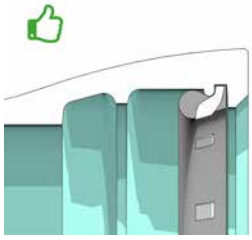
Insert the gasket into the socket so that the outer hard rubber claw engages in the retaining groove of the socket. Then smooth out the loop.

Smoothing out the gasket

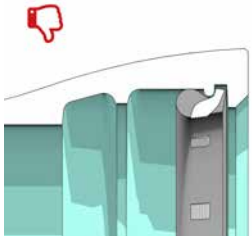
If smoothing the loop causes problems, pull out a second loop on the opposite side. These two small loops can then be smoothed easily.

Gasket seat

The inner hard rubber edge of the seal should not project over the centering collar.



Gasket in wrong position



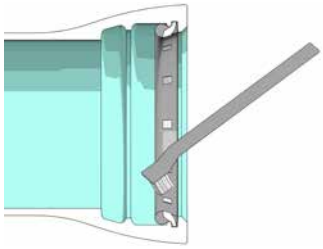
Pushing the labeling ring on

Push the labeling ring marked and profiled with white stripes onto the shank.

Lubricants

Apply a thin coat of lubricant to the tight-fitting gasket with stainless steel segments and the cleaned shank, especially at the bevel.

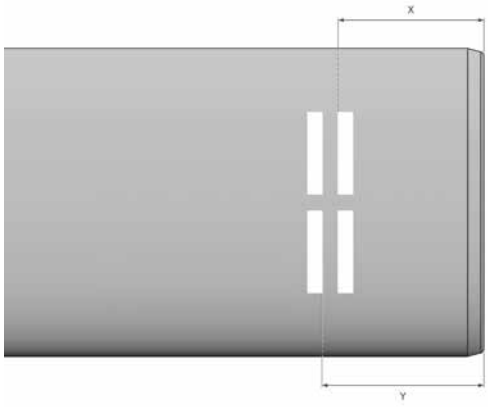
⚠ In case of frost or high heat, the lubricant and the gaskets must be stored together in one room.



Securing the joint

Insert or push the shank into the socket until the first marking line is no longer visible.

- ⚠ Insert or push in the straight (axial) shank.
- ⚠ Bending must be avoided during assembly.



TYTON®-SIT-PLUS joint DN 80 to DN 600

+ TYTON®-SIT-PLUS EPDM gasket ring according to EN 681-1 with stainless steel segments
+ Labeling ring

After securing the joint, check that the gasket is sitting correctly around the entire circumference using the surface feeler between the segments. The entire circumference should be penetrated evenly and deeply into the gap between the shank and the front of the socket. If it is possible to penetrate deeper at one or more points, the gasket may have been pushed out of the retaining groove at these points and leakages may occur. In this case, the joint must be disassembled and the gasket seat checked.

Bending the joint

Once the joint has been secured, the pipes and fittings can be bent:

+ DN 80 to 300 – max. 3°
+ DN 400 to 600 – max. 2°

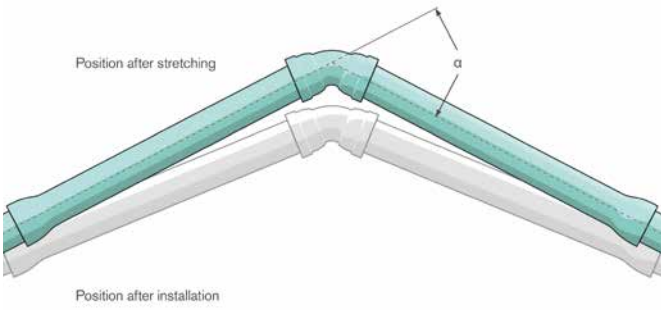
With a pipe length of 5 m, a 1° bend results in approx. 9 cm deviation from the axis of the previously installed pipe or fitting (e.g. 3° = 27 cm).

Labeling the TYTON®-SIT-PLUS joint

To permanently label the TYTON®-SIT-PLUS joint, we supply a profiled rubber ring with white stripes on the casing surface.
The ring is arranged as shown in the figure.

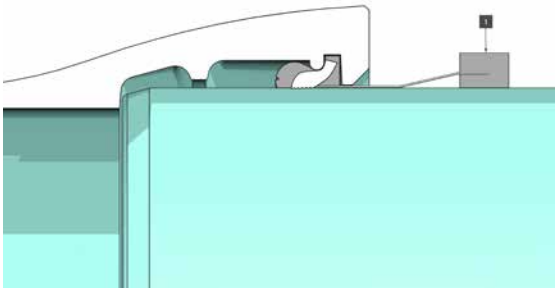
Assembly instructions

Please note that depending on the internal pressure and the joint tolerances, stretching of up to approx. 8 mm can occur for each joint. To take into account the stretching path of the pipe during pressure application, the joints at the bends are set negatively with the max. allowable bend.

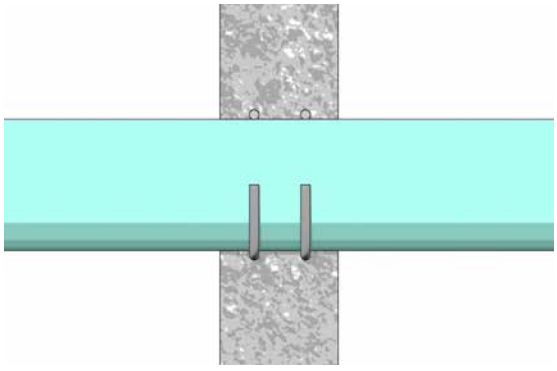


Disassembly

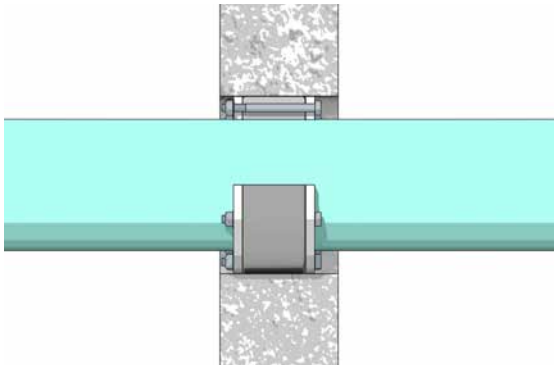
Push the pipe into the socket until it stops. Lubricate the disassembling plate and push it into the socket gap using the anvil. Then disassemble the joint with the assembly equipment or the disassembly clamp.
A disassembly device consists of an anvil and the number of disassembling plates shown in the following table.



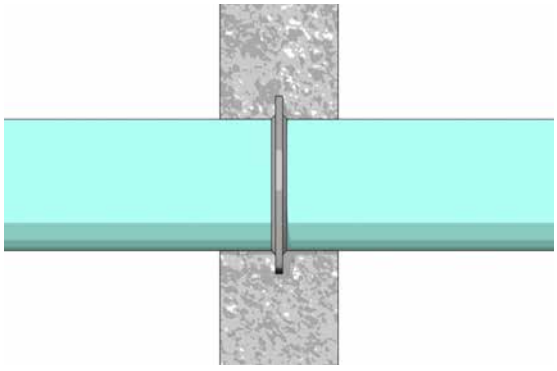
1 anvil with disassembling plates



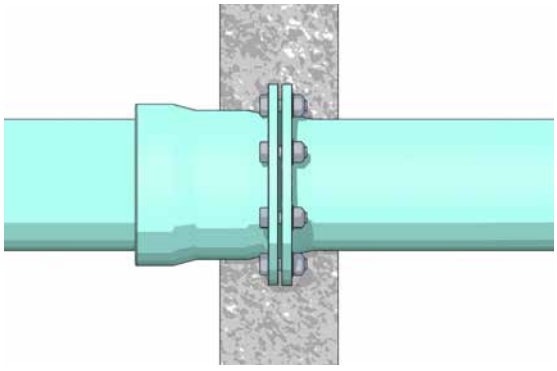
Gasket ring or expansion joint sealing strip (not included)



Annular gap gasket (not included)



welded wall flange (custom-made design)



EU and F fitting

Wall ducts

+ Gasket ring or expansion joint sealing strip *
+ Annular gap gasket *
+ welded wall flange (custom-made design)
+ EU and F fitting

⚠ * not included with TRM

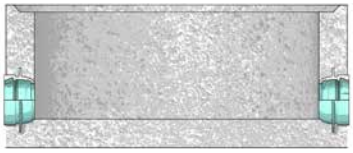
Shaft designs

When planning shaft connections, a basic distinction must be made between pressureless, open channels in the shaft and closed channels, which can also be designed to be suitable for pressure pipes.

The high compressive strength at the crown of ductile iron pipes means fractures from earth or traffic loads are virtually impossible. The shaft connection should therefore be made from the same high-quality material as the pipe.

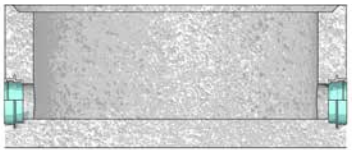
Shaft connection fittings from Tiroler Rohre GmbH are designed so that, as with pipe sockets, excessive decentering of the pipe at the sealing element is prevented by means of a centering collar. Double-jointed shaft connections using short pipes are therefore not required.

Shaft design with open channel



Shaft-connection fitting with VRS®-T socket

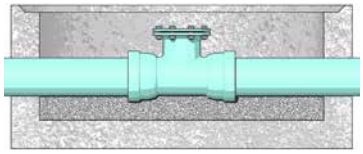
TRM shaft connection fittings with positive locking VRS®-T sockets are used in particular for steep slope pipes to connect the pipe to the shaft or a building with a restrained locking system.



Shaft connection fitting with TYTON® socket

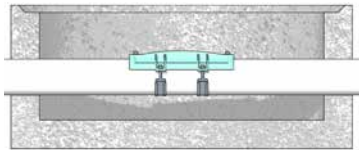
TRM shaft connection fittings with non-positive locking TYTON® socket are used for precast and in-situ concrete shafts. Channel design in GFK, clinker and concrete. The connection fittings can be installed in prefabricated shaft bases in the concrete plant, on the construction site or at the in-situ concrete shaft.

Shaft design with closed channel



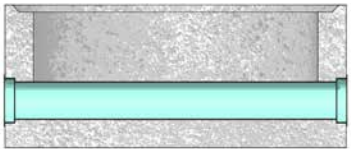
MMA fitting for cleaning shaft

MMA fittings for cleaning shafts in pressure channels (with and without tension and shear protection). Changes in direction can be made outside the shaft wall. Production in the course of laying or as a prefabricated part.



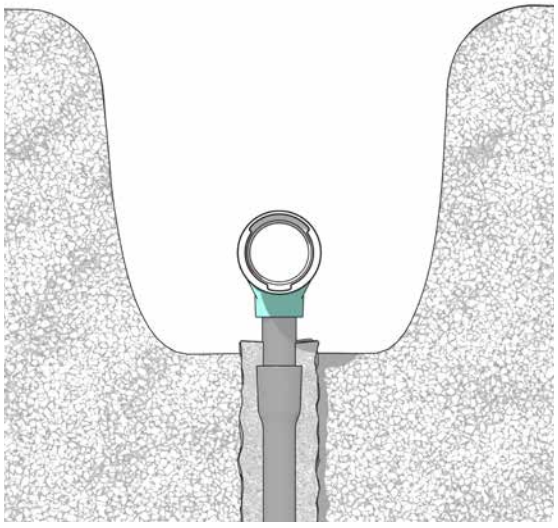
Pipe-cleaning fitting for cleaning shaft

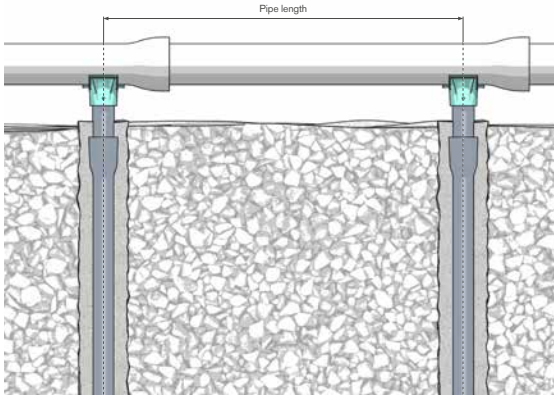
Pipe-cleaning fitting for cleaning and inspection purposes, also suitable for pressure channels. Changes in direction can be made using double-socket bends outside the shaft wall. Suitable as a chamber lock.



Shaft connection with prefabricated shaft bases

For prefabricated shaft bases, the channel and the shaft socket are made from wastewater-resistant plastic.





Pipe on pile

A basic requirement in sewer construction is that the pipe must remain at a constant gradient, but this is difficult to achieve with less stable soils, which in turn leads to high operating and maintenance costs.

Laying the sewer on ductile piles (which TRM also supplies) is the ideal solution. The unique strength properties of ductile sewage pipes make them virtually predestined for these types of installations.

Because of the high load-bearing capacity of the sockets, only **one support per pipe (5m length)** is required. When laid at low depths, the pipe wall thickness is increased to limit deflection.

Testing in collaboration with the Institute of Strength of Materials at the University of Innsbruck has proved the unique advantages of the "pipe on pile" system.

⚠ Please ask for further information!

PIPE SYSTEMS

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